

## 20.7: Solving Quadratics with Imaginary Roots

Recall:  $\sqrt{-1} = i$

Recall: Quadratic Eq:  $ax^2 + bx + c = 0$

3 ways to solve algebraically

1. Factor: DOESN'T Always Work

\* { 2. Complete the sq.  
3. Quadratic Formula

★ Always check your solution(s)  
with calculator

if  $2+i$  and  $2-i$  are solutions  
then

$$2+i \rightarrow X$$

type in eq. to see if it  
works!!

Ex: Solve for  $x$ , expressing your result in simplest  $a+bi$  form.

$$x^2 - 8x + 17 = 0 \quad (\text{Complete the square})$$

Ex: Solve for  $x$ , expressing the results in simplest  $a + bi$  form:

$$9x^2 + 2 = 6x \quad (\text{Quad. Formula})$$

Chapter 20.pdf - Adobe Reader

File Edit View Document Tools Window Help

102% Find

## EXERCISES WITH OPEN-RESPONSE PROBLEMS

In 1–12, in each case: a. Solve the equation, and express the roots in the form  $a + bi$ .  
b. Check the roots of the equation.

|                                  |                        |                              |                                 |
|----------------------------------|------------------------|------------------------------|---------------------------------|
| 1. $x^2 - 4x + 5 = 0$            | 2. $x^2 - 6x + 25 = 0$ | 3. $x^2 + 26 = 2x$           | 4. $x^2 + 29 = 10x$             |
| 5. $x^2 = 8x - 25$               | 6. $3x^2 = 6(x - 1)$   | 7. $\frac{x^2}{3} = 4x - 15$ | 8. $\frac{x^2}{2} + 3x + 5 = 0$ |
| 9. $\frac{x^2 + 21}{4} = 1 - 2x$ | 10. $2x^2 + 72 = 0$    | 11. $\frac{x^2}{5} + 5 = 0$  | 12. $\frac{x^2}{8} + 10 = 2$    |

946 : 3 - 27 (÷3)  
odd - complex sq  
even - quad. formula

20-8 The Nature of the Roots of Any Quadratic Equation 947

In 13–24, express the roots of each equation in  $a + bi$  form.

|                           |                          |                         |
|---------------------------|--------------------------|-------------------------|
| 13. $9x^2 - 6x + 2 = 0$   | 14. $2x^2 + 17 = 6x$     | 15. $4x(x - 2) + 5 = 0$ |
| 16. $x^2 + 36 = 7 - 10x$  | 17. $4x(x + 5) + 29 = 0$ | 18. $x^2 + 3 = 2x$      |
| 19. $2x^2 + 20x - 24 = 0$ | 20. $12x^2 - 4x - 2 = 0$ | 21. $25x^2 + 3 = 0$     |

8.49 x 10.99 in

$$24. \frac{x-3}{x} = \frac{x+19}{15} \quad (\text{Quad. Formula})$$